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Operational Commander's Risk Assessment: How Much Can You Really Afford to Lose?

by

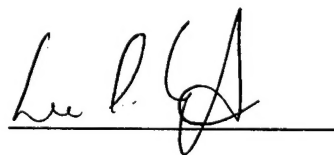
Lee T. Wight
Major, U. S. Air Force

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Joint Military Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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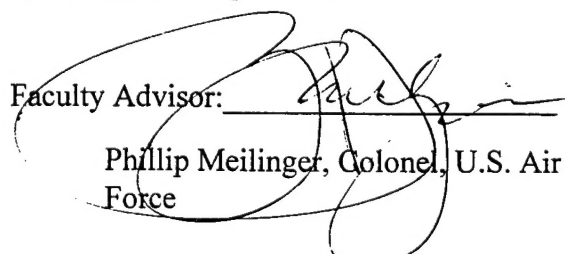
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Paper directed by
George Jackson, Captain, U.S. Navy
Chairman, Joint Military Operations Department

Faculty Advisor:



Phillip Meilinger, Colonel, U.S. Air Force

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<p>15. Abstract: In every operation, operational commanders must decide how much risk is acceptable and communicate that decision to their subordinates for subsequent planning and execution. Currently, there are no standard definitions for levels of risk in Joint doctrine. In fact, no common definition even exists for what "risk" means to the operational planner. In addition, there is no standardized method for operational commanders to communicate that information to their subordinates, nor are there quantifiable procedures for how a commander determines relevant risk levels.</p> <p>Based on the results of a survey of the Unified and Specified Commanders in Chief (CINCs), high-level planners, and respected doctrinal theorists, the author has defined "mission risk" and the method for its communication as "Acceptable Risk Level" (ARL) to subordinate units. Furthermore, ARL is subdivided into "Negligible, Low, Moderate, High, and Extreme" levels with standard definitions for use in subordinate decisionmaking.</p> <p>To minimize the potential impact of the "fog of war" on ARL communication, the author further recommends putting ARL guidance in the commander's intent section of operations and warning orders and making an ARL a mandatory requirement for all planning guidance.</p> <p>Finally, although much of the risk assessment process performed by the CINC will inherently be intuitive, the author offers two risk assessment models to assist in the training of future CINCs or for those decisions that are complex, not time critical, and/or must be justified to other decisionmakers.</p>			
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ABSTRACT

In every operation, operational commanders must decide how much risk is acceptable and communicate that decision to their subordinates for subsequent planning and execution. Currently, however, in Joint doctrine there are no standard definitions for levels of risk. In fact, no common definition even exists for what "risk" means to the operational planner. In addition, there is no standardized method for operational commanders to communicate that information to their subordinates, nor are there quantifiable procedures for how a commander determines when an operation is "high" risk as opposed to "low" risk.

Based on the results of a survey of the Unified and Specified Commanders in Chief (CINCs), high-level planners, and respected doctrinal theorists, the author has defined "mission risk" and the method for its communication as "Acceptable Risk Level" (ARL) to subordinate units. Furthermore, ARL is subdivided into "Negligible, Low, Moderate, High, and Extreme" levels with standard definitions for use in subordinate decisionmaking.

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Finally, although much of the risk assessment process performed by the CINC will inherently be intuitive, the author offers two risk assessment models to assist in the training of future CINCs or for those decisions that are complex, not time critical, and/or must be justified to other decisionmakers.

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*Degree of Risk: "As specified by the commander, the risk to which friendly forces may be subjected to the effects of the detonation of a nuclear weapon used in the attack of a close-in enemy target."*¹

-DoD Dictionary of Military and Associated Terms

*"Never bet more than you can afford to lose."*²

-"Some Homespun Wisdom on Risk Management"

Introduction

Risk is the figurative tightrope with which an operational commander's forces must cross the abyss of failure to successfully reach mission objectives. Although inherently dangerous, only by properly managing risk can battles be fought, wars won, and enemies conquered. How well a commander analyzes, accepts, and communicates risk to his subordinates as they walk that tightrope will determine whether they reach their objectives or are ultimately lost in the chasm. In effect, the operational commander must determine how thin the tightrope can be or what degree of risk he can accept in any operation. Turning to the Department of Defense Dictionary, however, one only finds the definition above for "degree of risk" which is applicable only if the commander is contemplating close-in nuclear operations. Perhaps the second definition, although "homespun," is more appropriate since a commander will essentially have to decide "how much he can afford to lose."

As one might assume from the definitions above and which my research confirmed, little exists to guide the commander other than intuition and experience. While this may be adequate for the commander, it does little to insure that his meaning will not be obscured by the "fog of war" and misconstrued by subordinates. Thus, this article will attempt to fill the void and propose standard definitions for levels of risk, methods for communicating them, and models to assist decisionmakers when conducting an operational risk assessment.

What Is Risk Assessment?

*"(During the planning for Operation EL DORADO CANYON, the planners)...had been designing a strike to minimize the risk of losing any aircraft. That was a natural act of self-preservation as well as a recognition that the loss of a single aircraft, the capture of a single pilot, would give Qaddafi an excuse to claim victory."*³

The above quotation from the planning for the 1986 airstrike on Libya illustrates the risk assessment process as it applies to military operations. Commanders at all levels must constantly balance the costs of an operation with its expected benefits. A considerable body of literature exists in the safety field on risk management (RM) and one of its components, risk assessment (RA). Such "safety" definitions termed RA as *"(the) ability to see the risks inherent in an operation (and) used to be called somewhat mystically, the 'sixth sense of safety.'"*⁴ Current definitions are more combat oriented and describe RA as *"the integrated process of identifying and characterizing a threat, analyzing vulnerabilities, and choosing appropriate countermeasures to abate the threat."*⁵ For the purposes of this paper, I will focus on the latter type of RA definition as it applies to the operational CINC's risk assessment process. Specifically, that portion conducted during the planning phase of any military operation where the operational impact of enemy actions on friendly forces is assessed and translated as tactical risk management actions to subordinate forces.

In situations like that of the Libyan operation, any loss--despite an apparently minor tactical significance--may have fatal strategic consequences and thus may not warrant the potential risk. In other situations, such as where a leader's survival or when a regime, political, religious, ideological, or economic system is at stake, virtually any level of risk may be acceptable.⁶ Of course, there are many other less drastic situations that fill the "gray area" on the continuum of risk.

As noted by Metz, “*(r)isk assessment occurs at all military planning levels. The platoon leader choosing among alternative routes to an objective considers the risk of injury, death or capture to the troops while a strategist developing global courses of action considers the risk of national defeat.*”⁷ Since many tactical actions may have strategic consequences, the CINC should provide a decisionmaking framework for all levels of force employment. However, as I discovered through my research, although this process is assumed to exist, in fact it is not formalized. A commander may specify operating instructions to limit threat exposure in certain situations (such as prohibiting flight below 10,000 feet). However, in circumstances other than this, subordinates can only guess at the commander’s intent. Consider the Operation DESERT STORM Rules of Engagement (ROE), which contained the altitude restriction mentioned above, but did nothing to resolve whether or not an aircraft on a bombing mission should abort a mission if engaged by enemy surface-to-air defenses. Did the risk of its potential loss outweigh the value of the target’s destruction? Before the reader assumes this issue only applies to air operations, consider the risk assessment made by Admiral Woodward during the Falklands conflict. He was forced to decide whether or not to risk the potential loss of his radar picket ships, (including the doomed HMS *Sheffield*) in order to protect the amphibious landing operation.⁸ Similarly, land commanders in situations such as those faced by General Schwarzkopf during Operation DESERT SHIELD must perform a risk assessment and determine when a defense in place outweighs the risk of a retreat.

Why Should Risk Assessment Procedures Be Formalized?

*"One goal of military planning is to reduce risk...(but) (o)ften risk analysis is implicit rather than deliberate. Experienced planners and commanders know they must incorporate risk into their calculations and do so instinctively. Unfortunately, such informal methods are prone to break down, especially in stressful situations."*⁹

Military literature establishes a consensus that commanders should perform RA. Admiral Kalbfus, in Sound Military Decision, states that *"the wise leader tallies up the 'costs and consequences' of success or failure, weighs them against those of other courses, and revises as needed."*¹⁰ In the Commander's Estimate Process, there are numerous encouragements to do a thorough risk assessment.¹¹ In fact, RA is one of the four questions central to the basic planning process which asks: *"Does the expected outcome justify the risk?"*¹² Yet, the Joint Publications library--with the exception of close-in nuclear strikes--is mum on the issue of defining "risk" or quantifying varying degrees of it. In fact, research showed only two published military attempts to define conventional levels of risk as they apply to combat operations. One Army attempt only applies at the tactical level.¹³ The second, although applicable to the operational commander and excellent in its reasoning, descriptions and examples, only applies to air operations and does not offer guidance on how the commander should select a particular Acceptable Risk Planning Factor (ARPF).¹⁴ Unfortunately, neither has been formalized into doctrine. DoD Terrorism Directive 2000.12 alludes to risk levels,¹⁵ but it provides no guidance on performing this risk assessment; nor do any of these publications contain any instruction on how to communicate the results of this process to one's subordinates.¹⁶ Apparently, RA is left to the commander's intuition. Granted, a commander's intuition is integral to any planning process, but as noted above, an informal process is apt to break down under stress. Additionally, the lack of a standard

format and method of transmission leaves the commander's intent vulnerable to the inevitable distortions arising from the historical "fog of war." Some even feel that "*unless commander's intent is clearly stated, understood, and respected, maneuver warfare cannot succeed.*"¹⁷ I contend even this understates the importance of commander's intent, as I believe it is critical to the success of all military operations.

How Do Commanders Assess Risk?

*"Best military judgment and experience."*¹⁸

-Colonel Dave Deptula, Riyadh "Black Hole" Planning Staff, Operation DESERT STORM, in response to the above question.

Given the importance of assessing and communicating an operation's acceptable risk level (ARL), I surveyed the Unified CINCs, senior service chiefs, combined planning staff members, and respected doctrinal authors to determine how the RA process actually occurred. Predictably, although all attached considerable importance to this issue, no consensus emerged as to process, definition, or method of risk assessment. The most formal procedure was USTRANSCOM's, where planners categorize threat levels and corresponding risk levels based on a variety of intelligence source information specific to each mission (See Appendix 1 for detailed description). Then, the commander makes a decision on the acceptability of potential risk in relation to mission priority. He also determines any necessary risk management actions. Other survey responses fell on the continuum of structure between USTRANSCOM's procedures and those described by Colonel Deptula above. Curiously, the survey shows although commanders recognize RA as critical to successful military planning, in practice most informally conduct RA based primarily on their own intuition and experience.¹⁹

Defining Risk: Mission Risk vs. Acceptable Risk Level (ARL)

Because there is no standard, before defining levels of risk, we should first agree on a definition of “risk” itself. In the context of operations, are we considering risk of casualties? Risk of mission failure? Metz argues at the tactical level risk is physical, while at the operational and strategic levels it is more political and psychological.²⁰ However, because of the strategic implications of casualties, such as the effect of losses on the subsequent withdrawal of US forces from Somalia and failure of United Nations Operations in Somalia (UNOSOM) II, I believe an operational commander must consider both risk of casualties and risk of mission failure. The survey results support this position. The only unanimous response on the survey was to question number one (see Appendix 7) in which all respondents defined risk as having elements of both casualties and mission failure. Therefore, each of my proposed risk levels contains both elements in its definition. However, merely categorizing a mission as “risky” does nothing to specify what level is acceptable to subordinates. Therefore, I separate “mission risk” from “Acceptable Risk Level (ARL).” “Mission risk” includes all of the risk factors an operation entails, including threat capabilities, exposure, vulnerability, target difficulty, weather conditions, unit training and capabilities, available technology, information sources, etc. In contrast, an ARL would be a commander’s directive to subordinates to shape further planning and execution decisions that specifies what level of potential losses is acceptable in order to achieve the mission objectives. Thus, we may refer to two different operations as being “high risk,” but because of their different costs and benefits (and their overall impact), use an ARL to direct

subordinates to take very few risks during execution in one situation and a different ARL directing intentional exposure to high losses in the other.

To determine an ARL, a commander must ultimately perform a subjective “cost-benefit” analysis and decide how much “mission risk” the success of an operation will justify or its failure support. In many cases, especially those where potential casualties or mission failure may have strategic impact, the National Command Authority (NCA) is likely to (and should) provide direction. In other situations though, the operational commander must choose himself and be judged by history. As discussed in the Libyan example, casualties or mission failure would have severe strategic impact, thus warranting few risks in execution. Similarly, because of the consequences of failure, an operation with “high mission risk” may necessitate its acceptance (such as defending one’s homeland against overwhelming forces). There are also situations warranting high risk in execution due to the potential “payoffs” of success. Such was the case in General MacArthur’s Inchon invasion during the Korean War. Although operations at these levels of risk may be more akin to “gambling” than “managing risk,”²¹ sometimes the gambler wins, and like MacArthur, achieve gains unattainable with lesser risk. Of course, before issuing a directive with such an ARL, the commander must ensure that he is not gambling the nation’s “pink slip” and can afford the consequences of failure (or has no other alternative). Thus, a commander’s weighing of this delicate balance, communicated through an ARL, fundamentally shapes subordinate planning and execution.

Historically when described, “risk” is separated into categories generally including “low,” “medium,” and “high” risk levels. I propose five categories to better define risk encompassing the spectrum of military operations. In turn, this will allow commanders to articulate an ARL. These ARLs and their proposed definitions are in Table 1 below.

<u>LEVEL</u>	<u>DEFINITION</u>	
	<i>ARL</i>	<i>Mission Risk</i>
NEGLIGIBLE	No losses except those completely unpredictable and unpreventable	Success assured with proper execution
LOW	Losses only at that expected for normal training or peacetime attrition rates	Success probable
MODERATE	Losses expected at historical combat rates	Success possible
HIGH	Expected losses may render units unfit for further combat	Success uncertain
EXTREME	Losses may result in complete force annihilation	Success unlikely

Table 1. Proposed Levels of Risk.

Used in this context, an ARL is independent of expected mission outcome (the “mission risk”). Thus, an operation labeled “high risk” only means that mission completion is forecast to be so difficult that “success is uncertain,” and it may have any of the five ARLs assigned, depending on the CINCs “cost-benefit analysis” regarding casualties. Whereas when a CINC assigns a HIGH ARL to an operation, it informs subordinates that the mission objectives are of sufficiently high priority to authorize tactics that may result in casualties severe enough to render a unit unfit for further combat. Also because “risk” includes elements of both objectives and casualties in its definition, “success” in “mission risk” means attaining mission objectives at the specified ARL. In the above example, a “high risk”

operation means it is uncertain whether mission objectives can be achieved with the potential for casualties specified by the ARL (whatever that may be for a particular operation).

How Should Acceptable Risk Level Be Communicated To Subordinates?

“Vice Adm. Kelso had stuck his finger in the middle of Rear Adm. Breast’s chest and said, ‘I don’t want any of our aviators walking down the streets with a noose around his neck.’”²²

Although Admiral Kelso’s method of communicating an ARL was effective in EL DORADO CANYON, however desirable it may seem, in most situations it is impractical for a commander to personally stick his finger in the chest of each and every subordinate. Clearly, in this example Admiral Kelso’s intent was no losses (at least none that could be exploited), but how should this be communicated in an environment where all of the operation’s participants are not within arms reach? One potential location for this information is in the “commander’s intent” section of the Warning or Operations Order (OPORD). Its purpose is to “...communicate to subordinates a goal that should be utmost in their minds as they execute the order.”²³ This would appear ideal as a location for such a critical piece of guidance as an ARL. Therefore, I recommend that once determined by a commander, an ARL should be included, using the proposed standard terminology, as a formal portion of the commander’s intent section in every type of planning guidance.²⁴ Specifically, the first paragraph of a Warning or OPORD under “assumptions,” should contain a statement such as: “ACCEPTABLE RISK LEVEL--NEGLIGIBLE.” Additionally, the Commander’s Intent section should include an elaboration such as (in the case of a NEGLIGIBLE ARL): “My highest priority for this operation is no losses.” In the case of a situation requiring an EXTREME ARL, the commander’s intent might be expressed

as: "Completion of mission objectives has priority over all other tasks. Commanders should use all means necessary at any cost required to achieve these objectives."

Historical Context For Future Use

Given that sometimes we must plan backwards in order to go forward, to understand how this system should be used, it is useful to look over our shoulder historically at conflicts falling into each of these categories and explain the rationale behind their categorization. Under the current climate of complete aversion to mass casualties, it is difficult to imagine any operation in which an EXTREME ARL would be necessary. Yet, if past is prologue, there may indeed be future conflicts requiring this risk level.

An EXTREME ARL is necessary when the survival of a nation or institution of similar significance is at stake. In this situation, the commander may perceive if the mission does not succeed, there will be no tomorrow. Such catastrophic consequences are associated with failure that no potential for future operations would exist. Certainly the World War II Japanese Kamikazes undertook an EXTREME ARL. Their commanders felt the very survival of the Japanese empire was at stake and that aviation capabilities (primarily due to the lack of trained pilots) had decreased to the point that suicide operations gave the only possibility of success. Potential modern-day examples that might necessitate an EXTREME ARL include preventing the launch of strategic weapons targeted at multiple civilian population centers with either high yield nuclear warheads or persistent biological agents for which there is no known antidote. In this Armageddon scenario, for the greater good, a commander might be compelled to risk complete annihilation of his forces.

HIGH ARL missions are similar to EXTREME ARL missions in that to accomplish mission objectives, the commander must accept the potential for major losses. The difference is that although failure will entail a major operational or even strategic setback, the commander requires some preservation of combat capability in order to retain the potential for follow-on operations. I would consider the defense of England by the Royal Air Force during the Battle of Britain a HIGH ARL mission. If the pilots failed on a given day, their bases might be bombed, but they could recover at alternate airfields and launch to continue the defense the next day. Suicidal engagements were not encouraged. Another example of a HIGH ARL was the defense of the Pusan perimeter by General Walker's troops during the Korean War. High attrition occurred, but had the defenders been pushed into the sea, although Korea might have been lost and a major strategic blow dealt, the survival of the United States was not threatened. US troops would have withdrawn rather than face complete annihilation. Because the very survival of their nation was at stake, South Korean commanders might have seen the same situation differently, however, and felt it warranted an EXTREME ARL.

Admiral Woodward accepted a MEDIUM ARL in the manner he positioned his naval forces during the Falklands conflict. He recognized that placing his aircraft carriers within range of Argentinean Exocet missiles was a HIGH ARL, since their loss would likely have led to British failure. Thus, he kept them out of range. However, positioning his picket ships forward, often without effective air cover, was a MEDIUM ARL since attrition was definitely possible (and certainly occurred at or exceeding historical combat rates), but the improvement in early warning better protected the amphibious landing forces and enabled

their eventual success. Moreover, loss of the picket ships ultimately was not fatal to the operation.

Operational commanders during the land portion of DESERT STORM essentially directed a LOW ARL. Although expected by some to be much higher, casualties occurred at approximately normal training rates (despite combat operations). Still, forces were to engage only on favorable terms (with overwhelming force) after extensive airborne battlefield preparation. Should forces encounter less than favorable conditions, they were to withdraw and wait for conditions to improve before attacking again (as the commander of the USS *Harlan County* did when opposed by armed thugs in Haiti), since leaders did not anticipate public support for higher casualty levels.

This operation in Haiti, as well as the previously discussed Libyan raid, the UNOSOM II operation in Somalia, and current Operation SOUTHERN WATCH, PROVIDE COMFORT, and DENY FLIGHT ROE are all examples of NEGLIGIBLE ARL operations. In all of these cases, commanders felt any casualties might result in strategic failure. This fear was realized in Somalia, as hasty withdrawal of US forces followed images of an American pilot being drug through the streets of Mogadishu. Fortunately, even though an F-111 was lost during EL DORADO CANYON, strategic failure did not result since the Libyans had no body to parade on television. Had Qaddafi managed to capture a hostage, public and world opinion might have changed.

Appendix 6 shows how ARLs apply to current No Fly Zone (NFZ) ROE and other air operations.²⁵ Similar charts can easily be made for land or naval forces.

How Should Commanders Choose An Acceptable Level Of Risk?

*"British World War II commanders' (in the North African desert)...failures were due to '(r)igidly methodical techniques of command, over systematic issuing of orders down to the last detail, and poor adaptability to the changing course of battle.' "*²⁶

-Field Marshal Erwin Rommel

Despite emphasis on decisionmaking based on a thorough analysis of all information and the completion of a Commander's Estimate of the Situation (CES), the realities of crisis and combat decisionmaking more closely resemble Colonel Deptula's description of decisions based on "best military judgment." Indeed, research indicates at least 80% and possibly as high as 95% of decisionmaking is intuitive rather than analytical.²⁷ Such prominent military figures as Clausewitz, B.H. Liddell Hart, Rommel, and more recently General Franks (Commander of VII [US] Corps during the Gulf War) suggest that commanders must make decisions intuitively when time is critical and information is either unavailable, incomplete, or overwhelming.²⁸ Otherwise, leaders may suffer a "paralysis by analysis."²⁹

There will inevitably be times (perhaps even a majority) when a commander will make a risk assessment decision based purely on his experience, intuition, and judgment. However, before readers dump their Commander's Estimate Workbooks wholesale, there are times when the analytical method offers advantages. According to Schmitt, these are: 1) when time is not a factor, 2) when decisionmakers lack the experience needed for sound intuitive judgments, 3) when the problem poses so much computational complexity intuitive processes are inadequate, or 4) when it is necessary to justify a decision to others or to resolve internal disagreements over which course to adopt.³⁰ Granted, a CINC should not suffer a lack of experience; however, as a training tool for future CINCs or for those situations in which the other three situations are relevant, I propose two simple risk

assessment tools. When considering these tools, it is imperative to remember they are only *guides* designed to assist the decisionmaker in analysis and in *no* case should they *substitute* for common sense.

Mission Risk Assessment Matrix

The matrix below is modified from a ground safety assessment matrix developed by Leonard A. Sorrentino.³¹

			PROBABILITY				
			FREQUENT	LIKELY	OCCASIONAL	REMOTE	UNLIKELY
			A	B	C	D	E
I M P A C T	NATIONAL SURVIVAL	I	EXTREME				
	STRATEGIC	II	HIGH				
	OPERATIONAL	III			MODERATE	LOW	
	TACTICAL	IV					NEGLIGIBLE

Table 2. Mission Risk Assessment Matrix

First, the user would determine the probability of casualties and mission failure based on available information (possibly from information developed in the Commander's Estimate process, among other sources) and correspondingly select from the options listed across the top of the matrix. Next, from the choices on the left side of the matrix, determine the level impacted by casualties or failure. The intersection of these two points will determine a "mission risk" (See example in Appendix 3). However, this is not an ARL. As previously discussed, a decisionmaker must perform a "cost-benefit analysis" to determine the ARL. Before making a final decision, a decisionmaker should also assess the ability to and impact of changing either mission objectives or force structure. Then, after making or requesting

changes, if the outcome still potentially impacts a higher level than that of his command, the CINC must consult that command level for guidance before proceeding (e.g. a CINC who determines that casualties or mission failure would have a strategic impact should consult the NCA--via the chain of command--for guidance). With this guidance, based on the results of his "cost-benefit analysis," a commander can then assign an ARL for subsequent planning.

Note that the mission risk category determined from the matrix may or may not match the ultimately assigned ARL. For example, a commander may judge an operation "high risk" because there is an "occasional" probability of casualties that could have "strategic" consequences (See Appendix 3). Because of this potential, although the NCA directs the CINC to proceed with the mission, he is also instructed to "not lose a single asset." Thus, the CINC assigns a NEGLIGIBLE ARL to the mission for subordinate planning and elaborates on that guidance in the Commander's Intent. On the other hand, a potential mission with a "frequent" probability of failure (intercepting ICBM warheads) and has "national survival" impact (warheads contain persistent biological weapons with no known antidote), would have both "extreme" mission risk and an EXTREME ARL.

Factor Comparison Method

Another RA option is to directly compare relevant factors to establish a numerical ratio. Based on the mission, this ratio determines a mission risk and is then used to establish an ARL. As above, the commander evaluates the impact of casualties or failure, assesses the ability to change mission elements and requests higher command guidance, then assigns the ARL (Reference Example in Appendix 5). From the factors developed during the strengths and weaknesses portion of the Commander's Assessment,³² select those that are relevant and

critical to the particular operation. In some cases a direct numerical comparison of a single factor is appropriate (e.g. all other factors except mass are judged relatively equal). In this case, reduce aggregate numbers (however they are determined³³--Armored Division Equivalent Numbers [ADE]³⁴, pure statistical data, etc.) to a ratio expressed in friendly to enemy numbers (e.g. 2 friendly ADE: 6 Enemy ADE = 1:3 ratio). Next adjust for the impact of mission type. According to Clausewitz and Sun Tzu "...the defense is the stronger form of war...."³⁵ Therefore, the attacker would require greater numbers, either in terms of "advantageous factors" or pure mass.³⁶ Interestingly, when used this way, the ratios roughly correlate to the "historical minimum planning ratios" for attacking or defending.³⁷ According to the historical data, a defending force could defend against a force approximately 2.5 times its own size in a hastily prepared position. Thus, it follows that if the defenders are "only" outnumbered by 2:1, their risk would be "moderate" (since success is possible, but casualties are likely to occur at combat rates). However, in the same situation, if they were outnumbered 3:1, the risk would be "high," and so on.

What if all factors are not equal? The method still works. In this case, simply weight the appropriate factor. For example, assume the force ratio is determined as 1:3, which by itself would equal "high" mission risk. But, friendly forces are estimated to be twice as capable as enemy forces. Apply the weighting factor (multiply friendly force times 2), then reduce the ratio again (2:3 to 1:1.5). With fractional remainders, in order to plan for the "worst case," round enemy numbers up to the nearest whole number and friendly forces down, if required. In this example, the friendly defending risk would be "moderate" (1:2);

but should they instead decide to attack, the risk would be "extreme." Remember, any weighting factor is subjective and requires intuition, experience, and common sense.

What if we are comparing different factors (see Appendix 5)? Simply list the appropriate critical factors in opposite columns and add them to arrive at a numerical ratio. If some factors are more significant than others, apply the weighting factor (mass is considered twice as important or the enemy has twice as much) then multiply times two, add the result as before and determine the ratio. After selecting the correct mission chart, note the mission risk.

Three salient points bear reemphasis. This entire process is only intended as a guide, is still subjective in some areas, may have exceptions, and should never be substituted for or used without applying common sense. Secondly, these guides only determine an approximate "mission risk." One must still consider potential changes and request higher level guidance, if required, before assigning an ARL. Finally, remember these processes are intended primarily for training, supporting a decision, or detailed analysis in a non-time critical situation. Under stress, an experienced commander will (and probably should) perform a similar mental process in a matter of seconds to avoid "paralysis by analysis."

Conclusion

Surprisingly, in this era of Joint Doctrine, a critical area has not yet been addressed. In the absence of detailed command guidance, the capabilities of modern tactical weapons may inadvertently have unintended strategic consequences. However, if my proposals are implemented, we have the opportunity to correct this omission and insure all levels of military command are speaking from the "same sheet of music" and thus, have better

analytical balance to guide their figurative walk across the tightrope of risk. First, we need to standardize the definition of “risk” and then understand the difference between “mission risk” and an ARL. Then, we can standardize individual ARL definitions in Joint Doctrine. Similarly, we should standardize how commanders communicate an ARL, with the Commander’s Intent section seemingly an ideal location. Finally, although not a substitute for intuitive decisionmaking, commanders and planners may elect to use either of the two models to assist in their risk assessment processes. As illustrated in Appendix 6, subordinate commanders may modify the guides and apply them to their specialized missions.

With this gap filled, we can now understand that a “high” risk mission with a “LOW ARL” is not the oxymoron it appears. Additionally, commanders at all levels would be better assured their intent will pierce the “fog of war” and reduce the chance of tactical actions having unintended, but severe consequences. Finally, the decisionmaking guides should help to remove some of the mystique from risk assessment. However, in no case should the guides become ends in and of themselves. As with all decisionmaking tools, the words of General Patton should be posted nearby: *“A good plan violently executed **now** is better than a perfect plan next week.”*³⁸

NOTES

- ¹ United States Joint Chiefs of Staff, Department of Defense Dictionary of Military and Associated Terms (Washington, DC: United States Joint Chiefs of Staff 23 March 1994), 109.
- ² John Sweeney, "Some Homespun Wisdom on Risk Management," Program Manager, July-August 1995, 22.
- ³ David C. Martin and John Walcott, Best Laid Plans: The Inside Story of America's War Against Terrorism (New York: HarperCollins 1988), 297.
- ⁴ Clyde A. Hennies and Paul A. Dierberger, "Risk Management: A Key Battlefield Edge," Military Review, May 1992, 33.
- ⁵ Jeffrey H. Smith and Daniel J. Ryan, "Commission Advocates Risk Management to Meet Changing World Conditions," Signal, June 1994, 60.
- ⁶ Keith B. Payne, "Deterring the Use of Weapons of Mass Destruction: Lessons from History," Comparative Strategy, Vol. 14, October 1995, 349.
- ⁷ Steven Metz, "Analyzing Strategic and Operational Risk," Military Review, November 1991, 78.
- ⁸ Admiral Sandy Woodward and Patrick Robinson, One Hundred Days: The Memoirs of the Falklands Battle Group Commander (Annapolis, MD: Naval Institute Press 1992), 175.
- ⁹ Metz, 78.
- ¹⁰ Edward C. Kalbfus quoted in Edward S. Miller, "Review of Sound Military Decision," Naval War College Review, Summer 1994, 163.
- ¹¹ Joint Maritime Operations Department, Commander's Estimate of the Situation Workbook (Newport, RI: July 1996), 2.
- ¹² Wayne A. Downing, "Joint Special Operations in Peace and War," Joint Forces Quarterly, Summer 1995, Number 8, 25.
- ¹³ Kevin J. Dougherty, "Scouts Engagement and Risk Assessment Criteria," Infantry, May-June 1992, 43.
- ¹⁴ Dan P. Leaf, "Acceptable Risk Planning Factor," Air Land Sea Bulletin, 94-1, 15-19.
- ¹⁵ Department of Defense, "DoD Combating Terrorism Program," DoD Directive 2000.12, Washington, DC: September 15, 1996.
- ¹⁶ Stephen Curran, <currans@transcom.safb.af.mil> "Commander's Risk Assessment Survey." 16 January 1997. Personal e-mail. (16 January 1997). One exception is USTRANSCOM's approach (see Appendix 1). Their approach quantifies both threat and risk levels and offers a detailed approach to its analysis, along with concrete procedures for dissemination.
- ¹⁷ Eric S. Downes, "The Decline of the Mission/The Rise of Intent," Marine Corps Gazette, April 1993, 50.
- ¹⁸ Dave A. Deptula. <Zatar1974@aol.com> "Risk Assessment Survey." 15 January 1997. Personal e-mail. (15 January 1997).
- ¹⁹ Michael E. Ryan, "Response to Survey Questions." 7 February 1997. Letter to the Author. Another notable procedure is that used by General Ryan, Commander United States Air Forces in Europe. His procedure is based on a combination of the ARPF recommended by Ryan in "Acceptable Risk Planning Factor," and Air Force Instruction (AFI) 91-213 "Operational Risk Management." This AFI, however, focuses primarily on safety instead of combat employment.
- ²⁰ Metz, 78.
- ²¹ Sweeney, 23.
- ²² Martin and Walcott, 286.
- ²³ Downes, 51.
- ²⁴ See Ryan, 17. Ryan recommends his ARPF be placed in the daily Air Tasking Order (ATO) for dissemination to tactical operations.
- ²⁵ See Ryan, 18. This table is developed from Ryan's examples of ARPF and expanded to include ARLs applied to air operations.
- ²⁶ Erwin Rommel quoted in Charles T. Rodgers, "Intuition: An Imperative of Command," Military Review, March 1994, 39.
- ²⁷ G.A. Klein quoted in John F. Schmitt, "How We Decide," Marine Corps Gazette, October 1995, 18.
- ²⁸ Rodgers, 42.
- ²⁹ John Adair quoted in Rodgers, 44.

³⁰ Schmitt, 18.

³¹ Leonard A. Sorrentino, "Risk Management," Mobility Forum, September-October 1995, 15.

³² Joint Maritime Operations Department, Commander's Estimate of the Situation (Newport, RI), 29-30.

³³ Ralph G. Rosenberg, "Relative Combat Power," Military Review, March 1978, 59.

³⁴ Joint Maritime Operations Department, Commander's Estimate Problem--Desert Shield (Newport, RI), 14.

³⁵ Michael I. Handel, Masters of War: Sun Tzu, Clausewitz, and Jomini (Portland, OR: International Specialized Book Services 1992), 98.

³⁶ In some cases this is even potentially applicable to air operations. A defending force might have advantages such as early warning, more effective communications, readily available command and control, and the support of surface defenses as part of an Integrated Air Defense System (IADS) that become force multipliers and make even air defense "stronger." However, because of its inherent uniqueness, the "Historical Planning Numbers" and their ratios may not be applicable.

³⁷ Commander's Estimate Problem--Desert Shield, 15.

³⁸ George S. Patton quoted in Schmitt, 17.

BIBLIOGRAPHY

- Battlea, John A. and Judith K. Grange, eds. The Military Applications of Modeling. Wright Patterson AFB: Air Force Institute of Technology Press, 1984, 38-49.
- Bauer, Eugene I. "Risk Assessment and Management." Ordnance, November 1993, 27-30.
- Bawden, Scott B. <BawdenS@stratcom.af.mil> "Commander's Risk Assessment Survey." 3 Feb 97. Personal e-mail. (3 Feb 97).
- Bjorkmas, M. "Time and Risk in Cognitive Space" in Risk and Society, ed. L. Sjoberg, 13-38. London: Allen and Unwin, 1987.
- Brasset, D. "U.S. Military Elites: Perception and Values" in The Anthropology of War and Peace, eds. P.R. Turner and D. Pitt, 32-48. Granby MA: Bergin and Garvey, 1986.
- Center for Army Lessons Learned. Initial Impressions, Volume 3: Haiti. Ft. Leavenworth, KS: U.S. Training and Doctrine Command, July 1995.
- Clark, M. M. "The Cultural Patterning of Risk-Seeking Behavior: Implications for Armed Conflict" in Peace and War, eds. M.L. Foster and R.A. Rubinstein, 79-90. New Brunswick, NJ: Transaction Books, 1986.
- Correll, John T. "High Risk Military Strategy." Air Force Magazine, September 1994, 34-42.
- Curran, Stephen. <currans@transcom.safb.af.mil> "Commander's Risk Assessment Survey." 16 January 1997. Personal e-mail. (16 January 1997).
- Department of Defense. "DoD Combating Terrorism Program." DoD Directive 2000.12. Washington: September 15, 1996.
- Deptula, Dave A. <Zatar1974@aol.com> "Operational Risk Survey." 14 January 1997. Personal e-mail. (14 January 1997).
- Dougherty, Kevin J. "Scouts: Engagement and Risk Assessment Criteria." Infantry, May-June 1992, 43-5.
- Douglas, M. and Widavsky, A. Risk and Culture. Berkeley: University of California Press, 1982.
- Downing, Wayne A. "Joint Special Operations in Peace and War." Joint Force Quarterly, Summer 1995, 22-27.

- Facsimile of "Risk Assessment Survey" from General Ronald R. Fogleman, U.S. Air Force Chief of Staff, Washington, DC. 30 January 1997.
- Facsimile of "Risk Assessment Survey" from General Richard E. Hawley, Commander, Air Combat Command, Langley AFB, VA. 14 January 1997.
- Facsimile of "USCENTCOM Response to Risk Assessment Survey" from Major Bill Mitchell, USCENTCOM J-5 staff, MacDill AFB, FL. 30 January 1997.
- Falk, Stanley L. "Leyte--Big Risks and High Stakes." Army, September 1994, 56-62.
- Gibson, M. "Are You Managing Organizational/Management Risk?" TIG Brief, March-April 1992, 9.
- Griffin, Wendell E. <GriffiwE@stratcom.af.mil> "Commander's Risk Assessment Survey." 15 January 1997. Personal e-mail. (15 January 1997).
- Handel, Michael I. Masters of War: Sun Tzu, Clausewitz, and Jomini. Portland, OR: International Specialized Book Services, 1992.
- Hennies, Clyde A. and Dierberger, Paul A. "Risk Management: A Key Battlefield Edge." Military Review, May 1992, 32-40.
- Hessman, James D. and Thomas, Vincent C. Jr. "Management of Aggressive Risks." Sea Power, September 1995, 12-16.
- Holritz, Robert T. "Measured Risk: Expanding the Envelope at Edwards (AFB)." Flying Safety, February 1993, 6-8.
- Joint Military Operations Department. A Guide for Evaluating Campaign Plans (NWC 4052). Newport, RI.
- _____. Commander's Estimate of the Situation Worksheet (NWC 4111). Newport, RI: July 1996.
- _____. Commander's Estimate Problem--Desert Shield (NWC 4046). Newport, RI.
- _____. Guidance for Writing a Directive (NWC 4067). Newport, RI: January 1996.
- _____. Strike Planner Checklist (NWC 3041). Newport, RI: July 1991.
- Kalbfus, Edward C. Sound Military Decision. Annapolis, MD: Naval Institute Press, 1992.

- Kasper, R. "Perceptions of Risk and Their Effects on Decision Making" in Societal Risk Assessment: How Safe is Safe Enough?, eds. R.C. Schwing and W.A. Albers, Jr., 71-84. New York: Plenum Press, 1980.
- Kelley, Herbert F. Jr. "Using Risk Decision Analysis to Solve Contractor Protests." Army Logistician, January-February 1990, 14-17.
- Kober, Avi. "Military Decision in War: A Framework for Research." Armed Forces and Society, Fall 1995, 65-82.
- Kuni, S. F. "Air Assault Decision Matrix." Infantry, May-June 1995, 41-43.
- Kurtis, William A. "High Risk Airstrike on Okinawa." Marine Corps Gazette, June 1995, 73-4.
- Leaf, Dan P. "Acceptable Risk Planning Factor." Air Land Sea Bulletin, 94-1, 15-19.
- Letter from General Binford Peay III, CINC CENTCOM, to the author, "Response to Survey," 11 February 1997.
- Letter from General Michael E. Ryan, CINC USAFE to the author, "Response to Survey Questions," 7 February 1997.
- Lorber, John G. "Control Risk, Eliminate Hazards, Reduce Losses." Combat Edge, June 1995, 8-9.
- MacCrimmon, Kenneth R. and Donald Wehrung. Taking Risks: The Management of Uncertainty. New York: The Free Press, 1986.
- Malinofsky, Martin. "Transportation Risk Analysis." Military Engineer, November-December 1992, 46-8.
- Martin, David C. and John Walcott. Best Laid Plans: The Inside Story of America's War Against Terrorism. New York: Harper Collins, 1988.
- Matthews, William and Wolffe, Jim. "This is Not a Mission Without Risk." Air Force Times, December 25, 1995, 14.
- Metz, Steven. "Analyzing Strategic and Operational Risk." Military Review, November 1991, 78-80.
- Miller, Edward S. "Review of Sound Military Decision," Naval War College Review, Summer 1994, 162-3.

- Mueller, Karl. <kmueller@max1.au.af.mil> "Operational Risk Assessment Survey." 14 January 1997. Personal e-mail. (14 January 1997).
- Payne, Keith B. "Deterring The Use of Weapons of Mass Destruction: Lessons From History." Comparative Strategy, October 1995, 347-59.
- Poindexter, G.W. and Bird, Julie. "Step Back for Women: Risk Rule Used to Deny Access to Helicopters." Air Force Times, August 15, 1994, 8.
- Quick, Jim and Wagner, Bill. "Operational Risk Management." Flying Safety, September 1994, 22-3.
- Rector, George E. Jr. "Leadership and Decisionmaking." Marine Corps Gazette, October 1995, 21-23.
- Robinson, Dave. "Risk: Its Assessment and Management." U.S. Army Aviation Digest, January-February 1992, 2-4.
- Rogers, Charles T. "Intuition: An Imperative of Command." Military Review, March 1994, 38-50.
- Rosenberg, Ralph. "Relative Combat Power." Military Review, March 1978, 56-67.
- Ross, L. and Anderson, C. "Shortcomings in the Attribution Process: On the Origins and Maintenance of Erroneous Social Assessments" in Judgment Under Uncertainty: Heuristics and Biases, eds. D. Kahneman, P. Slovic, and Tversky, 129-152. Cambridge: Cambridge University Press, 1982.
- Schmitt, John F. "How We Decide." Marine Corps Gazette, October 1995, 16-20.
- Short, J. F. Jr. "The Social Fabric at Risk: Toward the Social Transformation of Risk Analysis." American Sociological Review, 49: 1984, 711-25.
- Slovic, Paul. "Perception of Risk." Science, 236: 1987, 280-5.
- Slovic, P., Fischhoff, B. and Lichtenstein, S. "Facts and Fears: Understanding Perceived Risk" in Societal Risk Assessment: How Safe is Safe Enough?, eds. R.C. Schwing and W.A. Albers, Jr., 181-216. New York: Plenum Books, 1980.
- Smith, Jeffrey H. and Ryan, Daniel J. "Commission Advocates Risk Management to Meet Changing World Conditions." Signal, June 1994, 59-61.
- Sorrentino, Leonard A. "Risk Management." Mobility Forum, November-December 1995, 13-15.

- Stafford, John. "Aircrew Risk Management." Mobility Forum, September-October 1995, 28.
- Starr, C. "Societal Benefits versus Technological Risk." Science, 165: 1969, 1232-1238.
- Strednansky, Susan E. "Balancing the Trinity: The Fine Art of Conflict Termination." Maxwell AFB, AL: Air University Press, February 1996.
- Sweeney, John. "Some Homespun Wisdom on Risk Management." Program Manager, July-August 1995, 22-3.
- Tefft, Stanton K. "Cognitive Perspectives on Risk Assessment and War Traps: An Alternative to Functional Theory." Journal of Political and Military Sociology, Summer 1990, 57-77.
- Thomas, Vincent C. Jr. "Capability, Affordability, and Strategic Risk; Interview with LtGen H.C. Stackpole III, CG, FMFPAC (Commanding General, Fleet Marine Force, Pacific)." Sea Power, November 1992, 9-15.
- Turner, P. R. and D. Pitt, eds. The Anthropology of War and Peace. Granby, MA: Bergin and Garvey, 1986.
- Tversky, Amos, Paul Slovic, and Daniel Kahneman. Judgment Under Uncertainty: Heuristics and Biases. New York: Cambridge University Press, 1982.
- United States Air Force. Operational Risk Management Program. Air Force Instruction 91-213, CD ROM Version. Washington: 1996.
- United States Joint Chiefs of Staff. Department of Defense Dictionary of Military and Associated Terminology. Washington, DC: United States Joint Chiefs of Staff, 1994.
- Warden, John. <venturist@venturist.com> "Operational Risk Assessment Survey." 23 January 1997. Personal e-mail. (23 January 1997).
- Warren, Robert A. "Thinking Through a Complex Issue." Program Manager, May-June 1992, 32-4.
- White, Andy. "Reducing the Risk." Airman, December 1993, 40-1.
- Woods, Stephen L. "Threat and Countermeasure Factors in Risk Assessment." U.S. Army Aviation Digest, May-June 1994, 14-15.

Woodward, Sandy and Patrick Robinson. One Hundred Days: The Memoirs of the Falklands Battle Group Commander. Annapolis, MD: Naval Institute Press, 1992.

APPENDIX 1

USTRANSCOM PROPOSED THREAT ASSESSMENT DEFINITIONS, CRITERIA AND CATEGORIES^o

THREAT DEFINITIONS

NEGLIGIBLE: Seaport/airport*/air operations** safe/secure; existence and or capability may or may not be present; no reports demonstrating or expressing intent to target US interests or personnel.

LOW: Unlikely seaport/airport/air operations will be targeted; existence, capability present; history may or may not be present; no confirmed reports demonstrating or expressing intent to target US interests or personnel.

MEDIUM: Possibility exists that seaport/airport/air operations could be targeted; existence, capability, history, must be present; unconfirmed reports indicate intent to carry out hostile actions which could directly or indirectly impact US operations.

HIGH: Likely seaport/airport/air operations will be targeted; existence capability, history, and intentions must be present; *key determination of HIGH threat: confirmed reports demonstrating or expressing intent (with capability) to target US interests or personnel.*

CRITICAL: Seaport/airport/air operations actively/effectively targeted on an ongoing basis.

* *Airport* is defined as: The tract of land and physical infrastructure from which aircraft takeoff and land.

** *Air Operations* is defined as: The entire portion of the mission to include flight operations and ground time at airfields with the specified AOR.

THREAT CRITERIA

EXISTENCE: Hostile group(s) present, assessed to be present, or able to gain access to given country or facility; includes military/paramilitary/irregular armed forces, radical terrorist factions or rogue elements.

CAPABILITY: Acquired, assessed, or demonstrated capability to target strategic lift assets; includes capability to target assets en route (airlift: AAA, SAMs, fighter aircraft; sealift: surface combatants, submarines, mines, aircraft, missiles, pirates) and at ports of embarkation/debarkation (conventional military threat, SAMs, small arms, chemical/biological warfare, sabotage, terrorism, medical, criminal).

^o Stephen Curran, "Commander's Risk Assessment Survey," 16 January 1997.
<currans@transcom.safb.af.mil> Personal e-mail, (16 January 1997).

HISTORY: Demonstrated hostile intentions over time.

INTENTIONS: Recent demonstrated anti-US activity, or stated or assessed intent to conduct such activity.

CAPABILITY

CATEGORY I:

(AIR): Small numbers of relatively unsophisticated, man-portable air defense (MANPAD) surface-to-air missiles (SAM); small arms/automatic and light to heavy optically aimed anti-aircraft machine guns up to 12.7mm (.51 cal). The potential adversary is unable to respond due to limited weapons systems and/or a poorly integrated air defense network. Aircraft may require evasion or avoidance tactics, although there is little or no probability of enemy reaction directly or indirectly affecting the mission or operation.

(SEA): Small craft, airplanes, swimmers or shore facilities armed exclusively with guns and small arms. Possibly carry mines, torpedoes, rocket-propelled grenades or hand-held anti-tank rockets. Enemy ships range determined by fuel capacity and have limited communications. Enemy has no ability to track friendly units, surveillance by visual observation only. Enemy units threat only in immediate area of coastline (out to 30 NM). Friendly ships may have to stay over horizon from shore (around 30 NM), precautionary minesweeping may be necessary. Harbors in threat area require security. Friendly forces suffer little or no losses.

CATEGORY II:

(AIR): Category I weapons augmented by optically aimed anti-aircraft artillery (AAA) heavier than 12.7mm, older vehicle-mounted infra-red (IR) guided SAMs, more sophisticated MANPADs, early-generation radar-guided SAMs, and fighter aircraft lacking effective lookdown/shootdown and/or all-weather capability. Reflects a wider variety of more sophisticated enemy weapons systems in a moderately-integrated air defense network, but the weapons systems are insufficient in number or poorly deployed. Friendly operations may require independent suppression of adversary air defenses (SEAD), as well as avoidance tactics, threat evasion maneuvers, and on-board defensive systems.

(SEA): Littoral water warships and submarines that could carry mines, torpedoes, and anti-ship cruise missiles (ASCMs), aircraft armed with bombs or rockets, shore-based ASCM batteries, artillery or mortars. Enemy ships incapable of refueling at sea but have effective communications away from shore line. Enemy has little capability of tracking friendly units over horizon, may have observation posts and spotter aircraft. Enemy units threat in theater of operations, conduct isolated attacks with single type of weapons platform. Friendly ships require escort, defensive screens near threat areas. Operations may require suppressing enemy units before ships enter threat areas as well as defensive maneuvering and extensive

mine-sweeping. Harbors in threat areas may be under intermittent attack or mined. Friendly forces expected to suffer zero to moderate losses. Potential for heavy losses if enemy forces are effectively employed.

CATEGORY III:

(AIR): Categories I and II weapons augmented by all types of advanced generation SAMs, fighter-interceptor aircraft with true lookdown/shootdown and all-weather capability, helicopters with air-to-air capability, and directed energy weapons. Weapons are densely concentrated and/or part of a highly integrated air defense network. Without suitable defensive countermeasures, tactics, and force protection, penetration into this environment results in a high probability of detection and attrition.

(SEA): Blue-water warships and submarines, anti-ship cruise missile (ASCM) armed aircraft. Enemy ships capable of conducting open ocean operations and Over-The-Horizon-Targeting. Enemy has well established C3 and underway replenishment capabilities, able to track over the horizon. Enemy units pose threat at sea and all the way to destination, may conduct coordinated raids with several types of weapons platforms. Friendly units require constant convoy escort and defensive maneuvering, heavy mine-sweeping as regular operational procedure. Harbors in threat area prime targets. Friendly units suffer moderate to severe losses.

APPENDIX 2

MISSION RISK ASSESSMENT MATRIX (Blank)

			PROBABILITY				
			FREQUENT	LIKELY	OCCASIONAL	REMOTE	UNLIKELY
			A	B	C	D	E
I M P A C T	NATIONAL SURVIVAL	I	EXTREME				
	STRATEGIC	II	HIGH				
	OPERATIONAL	III			MODERATE		
	TACTICAL	IV					NEGLECTIBLE

APPENDIX 3

MISSION RISK ASSESSMENT MATRIX (Example)

		PROBABILITY				
		FREQUENT	LIKELY	OCCASIONAL	REMOTE	UNLIKELY
		A	B	C	D	E
IMPACT	NATIONAL SURVIVAL I	EXTREME				
	STRATEGIC II		HIGH			
	OPERATIONAL III			MODERATE	LOW	
	TACTICAL IV					NEGLIGIBLE

④ Determine ARL

Notes:

1) Determine probability of casualties and mission failure. In DESERT SHIELD example, CINC determines these to be "likely."

2) Determine level that failure would impact. Again, in above example, CINC determines casualties and mission failure would have strategic impact.

3) Read "mission risk." Intersection of "Likely" and "Strategic" yields "High" Mission risk.

4) Determine ARL from "cost-benefit analysis," potential to change mission or force structure, higher command guidance (if desired or required). For example, in DESERT SHIELD, if CINC determined that he had the ability to request more forces that might reduce the probability of mission failure to "occasional." However, impact of casualties/failure would still be "strategic." Thus, consultation with NCA would be required (or may have already occurred) prior to decision to execute mission. Based on this information, CINC would assign ARL (probably given sensitivity to casualties MODERATE ARL, independent of "High" mission risk for defense of Saudi Arabia).

APPENDIX 4

FACTOR COMPARISON CHART (Blank)

FRIENDLY CRITICAL FACTORS	WF	WEIGHTED FRIENDLY TOTAL	WEIGHTED ENEMY TOTAL	WF	ENEMY CRITICAL FACTORS

RAW TOTAL	
RAW REDUCED RATIO	
ROUNDED RATIO DEFENDER : ATTACKER	

MISSION: DEFEND

✓	RATIO DEFENDER:ATTACKER	MISSION RISK
	2+: 1	NEGLIGIBLE
	1 : 1	LOW
	1 : 2	MODERATE
	1 : 3	HIGH
	1 : 4+	EXTREME

MISSION: ATTACK

✓	RATIO DEFENDER:ATTACKER	MISSION RISK
	2+: 1	EXTREME
	1 : 1	HIGH
	1 : 2	MODERATE
	1 : 3	LOW
	1 : 4+	NEGLIGIBLE

Usage:

- 1) List critical factors to compare in appropriate columns.
- 2) Weight, if desired.
- 3) Determine Weighted Factor Total by multiplying weight x 1.
- 4) List raw total at bottom of friendly and enemy columns.
- 5) Reduce to ratio with lowest number having value of 1.
- 6) Round enemy ratio up to nearest whole number, if required; round friendly ratio down for worst case scenario.
- 7) Express rounded ratio in terms of Defender : Attacker.
- 8) Select appropriate mission chart (Defend or Attack)
- 9) Select appropriate ratio which determines **Mission** risk.
- 10) Assess ability to change mission objectives or force structure, if required.
- 11) Determine impact of failure.
- 12) Consult appropriate level commander for guidance, if required.
- 13) Assign Acceptable Risk Level (ARL).

APPENDIX 5

FACTOR COMPARISON EXAMPLE

FRIENDLY CRITICAL FACTORS	WF	WEIGHTED FRIENDLY TOTAL	WEIGHTED ENEMY TOTAL	WF	ENEMY CRITICAL FACTORS
AIR POWER	2	2	3	3	MASS
TECHNOLOGY	1	1	1	1	SCUDS
TRAINING	1	1	1	1	WMD
			1	1	ARMOR
RAW TOTAL		4	6		
RAW REDUCED RATIO		1	1.5		
ROUNDED RATIO DEFENDER : ATTACKER		1	2		

MISSION: DEFEND		
✓	RATIO DEFENDER:ATTACKER	MISSION RISK
	2+ : 1	NEGLIGIBLE
	1 : 1	LOW
✓	1 : 2	MODERATE
	1 : 3	HIGH
	1 : 4+	EXTREME

MISSION: ATTACK		
✓	RATIO DEFENDER:ATTACKER	MISSION RISK
	2+ : 1	EXTREME
	1 : 1	HIGH
	1 : 2	MODERATE
	1 : 3	LOW
	1 : 4+	NEGLIGIBLE

Notes:

- 1) Critical factors chosen from notional Commander's Estimate of the Situation--Desert Shield Problem (NWC 4046) which assumed a Gulf War build up situation prior to deployment of US/Coalition forces with capability for offensive operations.
- 2) Weighting factors are subjective, based on commander's experience and intuition.
- 3) Enemy's ratio always rounded up to nearest whole number; friendly ratio would be rounded down to nearest whole number for "worst case" scenario.
- 4) "Moderate" mission risk indicated for defense; if attack desired an "Extreme" mission risk would be indicated, changes to mission or force structure required. If unable, due to strategic impact of failure, would need NCA approval.
- 5) With defensive mission, commander might now assign "MODERATE ARL" indicating "losses expected at historical combat rates, success possible."

APPENDIX 6

RISK MATRIX APPLIED TO AIR OPERATIONS¹

ACCEPTABLE RISK LEVEL	<i>Friendly Numerical Equivalent²</i>	<i>Enemy Numerical Equivalent³</i>	DEFINITION ⁴	EXAMPLE
NEGLIGIBLE	1+	0	No Losses Acceptable ⁵	Current OSW ROE ⁶
LOW	1	1	Accept only favorable engagements	OCA Mission ⁷
MODERATE	1	2	Accept disadvantageous engagements; withdraw to preserve forces	DCA Mission with IADS ⁸
HIGH	1	3	Accept major losses to achieve objective; preserve some future capability, if able	DCA Mission without IADS ⁹
EXTREME	1	4+	Accept any losses necessary to accomplish mission	Defense against Nuclear or Biological Weapons ¹⁰

¹ Table developed from example in Ryan, "Acceptable Risk Planning Factor, 18.

² Provided only as an example of how a commander might apply numerical force ratios to an Acceptable Risk Level (ARL). For example, given a LOW ARL, if pilots encountered numbers exceeding 1:1, the engagement would be declined by withdrawing. Under a NEGLIGIBLE ARL, no engagements would be accepted within enemy weapons range. Also, note the higher risk levels associated with defensive missions.

³ See Note 2, above.

⁴ Definition only as it applies to air operations in these examples. Do not confuse with ARL definitions.

⁵ Other than normal operations "cost of doing business."

⁶ Operation SOUTHERN WATCH Rules of Engagement--strategic impact of *any* losses would be extreme.

⁷ Offensive Counter Air Mission--can withdraw at any time.

⁸ Defensive Counter Air Mission with Integrated Air Defense System support--need to defend point or area, but can withdraw to prevent heavy losses and still have point/area defended by other systems.

⁹ Point/Area will be undefended if withdrawal required, but loss of point/area will not impact strategic objective and preservation of combat capability desired for follow-on missions.

¹⁰ Any mission where consequences of failure are strategically, politically, or morally unacceptable; if mission fails, there is no tomorrow.

APPENDIX 7

RISK ASSESSMENT SURVEY

Office of respondent (e.g. CENTCOM J-5) _____

Please briefly answer the following questions as your office currently conducts planning:

1. How do you define operational "risk"?

- a. Potential failure of mission (objective) accomplishment.
- b. Potential for casualties.
- c. Both of the above.
- d. Neither of the above (please briefly describe):

2. How do you differentiate between the following levels of risk: none, low (minimal), medium, high, and extreme? (If you use specific definitions or do not use these levels of risk, please note below).

None:

Low:

Medium:

High:

Extreme:

3. How do you communicate the level of risk associated with an operation to your subordinates for planning? (OPORD, Commander's Intent, etc.)

4. What guidance do you use in determining appropriate levels of risk?

5. What guidance do you give to subordinate commanders in relation to a maximum acceptable level of casualties for a planned operation?